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CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0610 BIOLOGY

0610/22 Paper 2 (Core Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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General notes

Do not exceed the section sub-totals or question maxima.

Symbols used in mark scheme and guidance notes.

/	separates alternatives for a marking point
;	separates points for the award of a mark
MP	mark point - used in guidance notes when referring to numbered marking points
A	accept - as a correct response
R	reject – this is marked with a cross and any following correct statements do not gain any marks
I	ignore / irrelevant / inadequate – this response gains no mark, but any following correct answers can gain marks.
( )	the word / phrase in brackets is not required to gain marks but sets the context of the response for credit. e.g. (waxy) cuticle. Waxy not needed but if it was described as a cellulose cuticle then no mark is awarded.
<u>Mitosis</u>	underlined words – this word only

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Question	Mark Scheme	Mark	Guidance
1			If more than 1 line from any group – no mark for this group I – more than 1 line arriving at a description

group		description
annelids		hard, jointed exoskeleton, three pairs of legs;
insects		long cylindrical body, segmented, has bristles but no legs;
molluscs		long cylindrical body, not segmented, no legs;
myriapods		has soft body, head and muscular foot, most have a hard shell;
nematodes		exoskeleton, segmented body, jointed legs on each segment;

Any four – 1 mark each [4]

		[Total: 4]	

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2 **(a)**	**(i)** 1 removal of waste from body; 2 (waste) formed by body cells / metabolic (waste); 3 ref to substances that are toxic / in excess; Any two – 1 mark each **(ii)** carbon dioxide; **(iii)** urea **and** salts;	 [2] [1] [1]	I – refs to examples A – tissues R – if any ref to glucose A – other correctly named substances Note **both** for 1 mark
(b)	**A** – renal artery; **B** – urethra;	 [2]	
(c)	1 amino acids absorbed in (small) intestine; 2 carried to liver; 3 by hepatic portal vein; 4 (amino acids) converted to urea; 5 (urea) carried to the kidney; 6 in blood (plasma); 7 (urea) removed from the blood; 8 (excreted via) bladder / urethra; Any four – 1 mark each	 [4]	A – duodenum or ileum A – deamination R – wrong substances
		[Total: 10]	
3 **(a)**	(tomato) (juicy / fleshy part of) fruit eaten by animal; (seeds) carried away on beak / dropped in faeces; (dandelion) very light / ref to parachute / seed buoyant; blown by wind / floats to ground;	 [2] [2]	 A – bird, mammal

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(b)	1 large numbers of seeds produced; 2 to colonise new areas; 3 need to avoid competition (with parent plant); 4 need to avoid competition with other seedlings; 5 for light / water / minerals / space; 6 increase chance of survival from disease / natural disasters; Any three – 1 mark each	[3]	A – form new colonies
		[Total: 7]	
4 (a)	Nitrogen	[1]	
(b)	**(i)** 0.5 (dm^3); **(ii)** 16; **(iii)** 8 (dm^3); **(iv)** 8 × 5/100; 0.4 (dm^3);	[1] [1] [1] [1] [2]	 A – ecf from **(i)** and **(ii)** A – ecf from **(iii)** Correct answer but no working shown 2 marks

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(c)	**(i)** (both) increase; **(ii)** 1 allows them to take in more air; 2 can absorb more oxygen; 3 for more respiration / release more energy; 4 can remove more carbon dioxide; 5 ref to more muscle contraction; Any two – 1 mark each **(iii)** 1 heart rate increases (during exercise); 2 increases rate of blood flow; 3 blood transports oxygen / glucose; 4 increase delivery (of oxygen / glucose) to cells / tissue; 5 increases removal of carbon dioxide / heat / waste from cells / tissues; 6 ref to muscle contraction; Any three – 1 mark each	[1] [2] [3]	Ref to more (or equivalent) needed at least once in responses Note – response must be in context of breathing, gas exchange Note – response must be in context of circulation
		[Total: 12]	

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5 (a)	**(i)** 1 (only) organisms that can photosynthesise; 2 incorporate / trap energy into system; 3 convert light energy into chemical energy; 4 provide energy / food for all other species / rest of food chain / web / OWTTE; Any three – 1 mark each	[3]	A – ref to autotrophic A – food web
	(ii) mouse; katydid; tapir; howler monkey; sloth; Any two – 1 mark only	[1]	Note – **two** herbivores for 1 mark
	(iii) (trophic level) 3;	[1]	
	(iv) tree / other plant, katydid, frog, (blue-crowned) motmot, boa constrictor; five organisms in correct order (as shown by arrows);	[2]	need all five species A – boa, constrictor, snake starting with producer on left
(b)	numbers are likely to increase; less competition for food / sloths / howler monkeys;	[2]	A – more food supply
(c)	1 less food as many species destroyed / become extinct; 2 less materials (for use); 3 soil becomes less fertile / eroded; 4 (thus) less land for growing food crops; 5 increased risk of flooding / landslips; Any two – 1 mark each	[2]	A – one other valid suggestion
		[Total: 11]	

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6 (a)	(i) **S** – umbilical cord **T** – uterus (wall);	[1]	**both** correct for 1 mark A – womb I – ref to lining
	(ii) 1 transfer of materials / OWTTE; 2 by diffusion; 3 between blood (system) of mother and fetus; 4 e.g. oxygen / glucose / amino acids (to fetus); 5 carbon dioxide / urea (from fetus); 6 progesterone (from placenta) maintains uterine lining / prevents miscarriage; Any three – 1 mark each	[3]	A – embryo, baby A - waste (from fetus)
	(iii) 1 mother's blood at higher pressure than fetal blood; 2 mother's blood would burst fetal blood vessels; 3 mother's blood can be a different blood group to fetal blood; 4 this will avoid coagulation of fetal blood; 5 mother's blood can carry pathogens; 6 fetus not infected; 7 mother's blood can carry toxins / drugs; 8 fetus not poisoned / affected; Any two pairs – 2 marks each	[4]	A – can damage organs e.g. brain, kidney, etc A – blood type A – avoid blood clotting, A – 'rejection' of blood / OWTTE A – named example A – named example
(b)	produces normal haemoglobin;	[1]	A – does not have beta thalassaemia
(c)	(i) **bb**; (ii) **Bb**; (iii) **Bb**;	[1] [1] [1]	

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(d)	father **and** mother;	[1]	**both** for 1 mark A – the parents
		[Total: 13]	
7 (a)	1 evaporation; 2 condensation / cooling; 3 transpiration;	[3]	A – evapotranspiration or evaporation
(b)	1 passage of water washes away / erodes soil particles; 2 (leads to) thin / unstable soil on mountain sides 3 mineral salts dissolve; 4 leaching; Any two - 1 mark each	[2]	I – refs to nutrients A – (mineral salts) carried away by water flow
		[Total: 5]	
8 (a)	**(i)** **A** – cuticle; **B** – palisade (layer / mesophyll); **(ii)** prevent / reduce water loss / evaporation; **(iii)** to allow diffusion / movement of gases into / out of the leaf;	[2] [1] [1]	I – mesophyll unqualified A – excludes pathogens A – refs to oxygen, carbon dioxide, water vapour, open and close stomata

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(b)	**(i)** 6 pm;	[1]	
	(ii) points correctly plotted; ± half mm square		A – up to 2 plotting errors
	points joined by line;	[2]	
	(iii) from 4:30 pm (± 10) to 4:50 am (± 10);	[1]	A – values, in correct sequence, from candidate's graph
	(iv) they are open;	[1]	
	(v) light;	[1]	
	(vi) wind speed increases; removes saturated air from area of leaf; increases diffusion gradient / easier for diffusion to occur / increase rate of diffusion; OR rise in temperature; air can hold more water vapour; increases rate of diffusion / increases diffusion gradient; OR fall in humidity (in atmosphere); air can hold more water vapour; increases diffusion gradient / increases rate of diffusion / easier for diffusion to occur; Any set of three – 1 mark each	[3]	If (b)(v) wrong or blank accept set of responses below: A – light intensity increases; A – stomata open more; A – easier for diffusion to occur
		[Total: 13]	

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9	(a)	girl in GB eats much more than the girl in Africa;	[1]	A – correct numerical response based on data in table
	(b)	1 as less excess sugars converted to fat; 2 African girl less likely to be obese; 3 less acid formed by bacteria (from sweets and sugar); 4 less likely to suffer from tooth decay; Any two – 1 mark each	[2]	
	(c)	1 cannot form new cytoplasm / cell membranes / enzymes; 2 growth slower / less growth (of bones and muscles) / ref to kwashiorkor; OR 3 difficulty in producing some hormones; 4 onset of puberty / development delayed; Either response pattern – 2 marks	[2]	2 A – refs to maintenance, repair
			[Total: 5]	

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